3-86

ZERO BEAT

AMSAT

Hampden County Radio Association

Springfield, MA March 1986 ARRL Affiliated, 38th Year

SNOWSTORM CANCELLED THIS- RE-SCHEDULED TO MARCH 7TH

Next Meeting

EMI - RFI - TVI

Interference problems? Come to the February 7th meeting and learn how interference occurs and what steps can be taken to prevent it.

Our guest speaker is Fred Helene, Senior Staff Consultant from R & B Enterprises, in Pennsylvania. Fred has over 25 years experience in the field of Electromagnetic Interference, including equipment design, testing, and solving of interference problems.

Fred will give examples of problems he has worked on, along with explanations of some common and not so common ways it can occur! Problems relating to consumer electronic items will be discussed.

This will be a very interesting meeting. The topic hits most every amateur who has neighbors nearby!

Feeding Hills Cong. Church
Center of Feeding Hills
Routes 57 and 187
Doors open at 7:30 PM
Meeting starts promptly at 8:00 PM

Please, no smoking during the meeting! Thank you!

NO SMOKING

Dues are $9.00 per season, September thru June. Please mail to: N1AEH, Greg Stoddard, 1500 Mapleton Avenue, Suffield, CT 06078. Thank you!

SPIRITUALITY

January 29, 1986. The American flag in the front parking lot at ARRL HQ was flying at half-mast as this writer arrived for work at 9 AM. You know the reason. Seven of us had embarked on a quest the previous day, never to return. Another of us, the President of the United States, had eulogized them later on that terrible day. "We will never forget them," Ronald Reagan said. "nor the last time we saw them, this morning, as they prepared for their journey and waved goodbye, and slipped through the surly bonds of earth, to touch the face of God."

They rose aboard a species of machine, a machine called Shuttle Challenger. We have had great success with machines. Less than a week before Challenger took to the sky, we'd ohhed and ahhed images brought us by another stupendous machine: Voyager 2, away from Earth for so many years, chugging out those stunning vistas of Uranus and its moons, signals taking so many minutes to reach us, pictures so clear. What a machine! Some of us — radio amateurs, we're called — may even have witnessed the retransmission of some of those images in our amateur bands, from the Jet Propulsion Laboratory, from W6VIO, just as many of us may have heard Amateur Radio signals emanating from Challenger so few months ago, when several of our number were part of her crew — all brought us by our collective handiwork: wondrous machines, systems going well, networks holding together. But recall that there were cold eyes in a mindless construct feeding us those images; it took **our** imaginations and intellects, after **our** eyes and brains had scanned the images from Voyager, to do the ohing and ahhing, the dreaming — and the going on.

This is why there were seven people aboard Challenger on January 28, 1986. It's too inhospitable out there near Saturn and Uranus, sure — our machines haven't yet been perfected to the point where they'll get any of us out there to do the real-time real-space dreaming and get us safely home again. So we send a machine and prepare to be thrilled from afar. We don't stand for this "thrilled from afar" stuff any longer than we need to, though. The idea is to get out there and do it ourselves. The intent is to feel the real hands grasping the actual controls, to let the true light fall on the living retinas. Why? Because our push into space is arguably the greatest spiritual quest on which humans may collectively embark. It's in the blood, it's built into our cells.

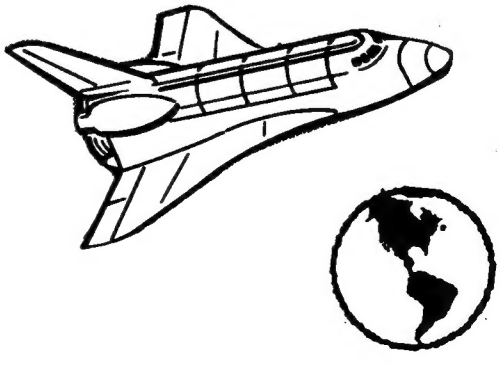
"Whoa, The ARRL Letter's talking spirituality; break out the Halon extinguishers!" Not at all. The first experiments trying to crack the radio "nut" last century were part of the same spiritual quest to which the Challenger crew were committed. Our first lispy blurps on five meters were more of the same. We got there with machines of wire and glass, and with deceptively little risk, but with machines no less wondrous even if tossed together on a kitchen shelf. The goal, this writer insists, is primordial: humankind, Us with a capital 'u,' expanding beyond where and what we are — an enormous slow yearning over myriad generations to push from the known into the unknown. The expansion of mankind right before its own eyes. If that isn't spirituality, what is? Sure, our society is vast, the means through which we individually participate in the push into space democratic and bureaucratic — long concatenations of taxes, politicians and specialists between each of us and those chosen to "push back the envelope" — but the quest is what it has always been: utter spirituality, everything on the line.

That's why the slug in the gut when we saw Challenger fell. **That's** why the dazedness, the anger, the flags at half mast. Seven of us we **instinctively** realize we had utterly accepted — and loved — as our proxies in that quest, gone. No rejoicing, as we'd planned — but still the dreaming, and the going on.

January 28, 1986

Gregory B. Jarvis	Ellison S. Onizuka
Christa McAuliffe	Judith A. Resnik
Ronald E. McNair	Francis R. Scobee

Michael J. Smith



Join the SWOT Team!

2m FM is fun, but using a repeater won't challenge your skill. Turn the switch to SSB and find out what ham radio is really about!

Even as little as fifteen years ago, 2-meter SSB was basically considered a barren no-man's-land with only a handful of operators occupying the band. Activity was slight, even in heavily-populated areas such as the Northeast, with numerous band openings going unnoticed. However, the status of 2-meter SSB has changed dramatically since then, especially over the last decade.

With the advent of fully-synthesized multimode rigs and affordable power amplifiers, receive preamplifiers, and antennas, 2-meter-SSB capability is readily available at modest cost and is no longer the mode once inhabited almost entirely by the home-brewer and experimenter. Even so, there are many amateurs who underestimate its potential in terms of DX and reliable communication over appreciable distances. For the Technician-class licensee who yearns to work some interesting DX or for the old-timer who has had it with crowded repeaters, 2-meter SSB may be a ticket to fun and enjoyment.

Let me point out that the main intent of this article is basically to inform the reader that there is an abundance of 2-meter SSB/CW activity taking place and to introduce the "Sidewinders On Two" organization, otherwise known as SWOT, which caters to the SSB/CW enthusiast. To fully cover areas such as antennas and radiowave propagation would be almost impossible, as books have been written on these subjects. Therefore, I will make generalizations which can be researched through further reading.

Getting on the Air

Unlike years gone by, 2-meter multimode transceivers are readily available as either large base-station units with built-in ac power supplies or as smaller base/mobile rigs which require an external dc power supply if they are to be used at the home station. Whatever way you decide to go, remember that the cost of a multimode rig is not much more than that of an FM transceiver.

Two features which now are standard on most of the newer rigs have made life easier for the sideband: scanning and squelch on sideband. Besides having the transceiver scan for signals during slow periods, listening to receiver white noise for hours on end is a thing of the past. As for power outputs, most rigs now on the market run anywhere from 10 to 30 Watts, which is sufficient to work DX in most cases.

Transverters. If it is not feasible to purchase a separate multimode rig, then a transverter would be an alternative to get on the band.

If you currently maintain an HF station that was manufactured in the mid 1970s or later, there's a good chance that the manufacturer of the rig has a 2-meter transverter which is compatible. The cost of a transverter, even if it requires modifications for use on your HF rig, is well below that of a separate multimode transceiver.

Antennas

Polarization. Some amateurs who purchase multimode rigs are disappointed when they venture into the low end of 144 MHz in hopes of finding someone to talk to, but hear nothing but receiver white noise instead. Although it is no fault of their own, a common mistake made by newcomers to the band is to start tuning around using a vertically-polarized antenna. Unless they are in a heavily populated area with many stations active on the band, chances are that they will hear absolutely nothing.

On 2-meter SSB, just about everyone is horizontally polarized, and because of this, vertical antennas do not perform well. The cross-polarization loss between a station running vertical and a station running horizontal is debatable. However, most agree that it is in the area of 20 dB. With a loss figure this high, even local stations can sometimes be very weak, with severe fading if two stations are cross-polarized.

Horizontal polarization is preferred because signals that are polarized in this fashion are more consistent over greater distances, with less fading and flutter. Also, since most man-made electrical noise is vertically polarized, a horizontal antenna exhibits a nulling effect which greatly reduces static noise levels.

The yagi. Just as ground planes are used widely for FM work, yagis are the workhorse of the SSB operator. Most operators utilize a single long-boom yagi mounted high enough to clear any serious obstructions. Even if the antenna is 30 feet off the ground, if it's clear of nearby buildings, trees, or power lines, it should work flawlessly. Long-boom yagis are generally 15 to 20 feet in length with forward-gain figures of roughly 12 to 16 dB.

Being relatively small compared to its HF counterparts, the main advantage of the yagi is that it is lightweight; it can be turned easily with a small TV-type antenna rotator. A single yagi will work quite well even with 10 Watts, but usually the more serious operators or EME (moonbounce) enthusiasts stack their yagis in large arrays for greater gain and directivity. Besides the yagi, other antennas which are used on SSB to a lesser extent are collinear arrays and quads.

Omnidirectional antennas. If it is not feasible to erect a beam antenna due to space limitations, then a compromise would be a halo. The halo is an omnidirectional, horizontally-polarized antenna which exhibits less than unity gain. Halos are quite popular with 2-meter-SSB mobile operators because they are relatively small.

Another choice would be the squalo, which is actually a square halo. Back in the 1960s Cushcraft Corporation manufactured a squalo, and at times they can still be found at hamfests and electronics flea markets.

Probably the best horizontally-polarized omnidirectional antenna that one could use would be the Big Wheel. As with the squalo, the Big Wheel was manufactured by Cushcraft back in the 1960s. It was very popular due to the fact that it was rated at 3-dB gain, making it that much better than the unity-gain halo and squalo. Also, Big Wheels could be

Harry A. Schools KA3B
1606 S. Newkirk Street
Philadelphia PA 19145

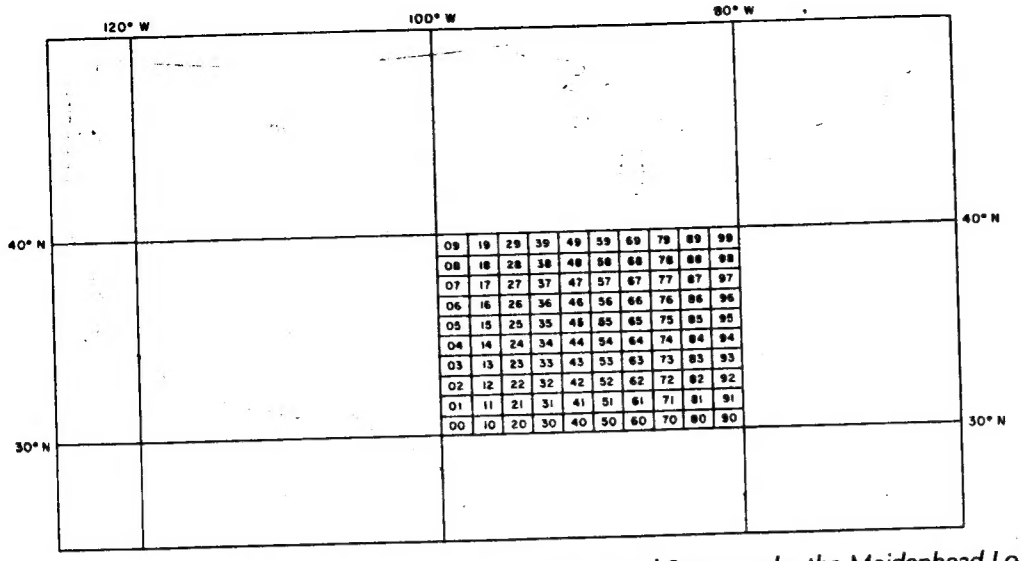


Fig. 1. Shown above is the grid-square layout for the United States under the Maidenhead Locator. Each field is broken down into 100 2° × 1° grid squares measuring approximately 100 × 70 miles in size, and numbered exactly like the Echo Mike field in the diagram. To figure out your own grid-square locator number, refer to the article on page 49 of the January, 1983, QST or the October, 1982, issue of the Lunar Letter, *edited by KI7D.*

stacked for even greater gain, making them that much more desirable for those who cannot erect beams. Shaped like a three-leaf clover, Big Wheel construction articles are quite common in VHF antenna books under names like the cloverleaf and the turnstile.

Power

As noted before, 10 to 30 Watts is an adequate power level for working most types of DX on 2 meters. However, when it comes to attempting contacts on meteor scatter or aurora, a higher output power will prove beneficial. I don't mean to imply that it can't be done with 10 Watts . . . it can! But due to the nature of these propagation modes, a higher power level is required for optimum results. Most newcomers to the band soon find out that the average station runs somewhere in the area of 80 to 170 Watts. And just like the HF bands, 2 meters has its share of those who run the full legal limit, especially where moonbounce is concerned.

Amps and Preamps

As with multimode rigs, there is a wide variety of solid-state amplifiers available on the market. Most of these amplifiers require anywhere from 1 to 30 Watts of drive and will deliver anywhere from 80 to 160 Watts, depending on the model. Besides being switchable for SSB or FM use, most of these amps are also supplied with receiving preamplifiers which greatly improve the signal-to-noise ratio of the received signal. For those operators who desire even higher output, there are many amplifier kits available for the home-brewer, and to a lesser degree commercially available units which will provide a solid kW.

Contrary to popular belief, most of the rigs today do not have hot receivers. Anyone who has been involved with the band for any length of time will tell you that the addition of a receive preamplifier is a must. For communications within a few hundred miles, a stock receiver may work just fine, but for weak-signal work or during marginal band openings, most rigs can't cut the mustard. The addition of a receive preamplifier can make the difference between getting a Q5 copy on a signal or not hearing it at all.

Preamplifiers can be purchased as small circuit boards which can be internally mounted to your existing transceiver, as separate enclosed units with BNC or SO-239 connectors for quick and easy installation, or as the highly sensitive mast-mounted GaAsFETs.

Propagation

Radio-wave propagation on 2 meters falls basically into two categories, these being tropospheric and ionospheric. The troposphere is a region which extends from the ground up to about eight miles. It is here that most VHF propagation takes place and also where our weather is formed. Because of this, 2-meter signals are greatly affected by temperature, water vapor, pressure, and, in general, the movement of air masses and weather systems. Two types of tropospheric propagation that occur quite frequently are: thermal inversions which can extend signals beyond 500 miles, and tropospheric ducting which has the ability to carry signals in excess of 2000 miles.

Temperature inversions. Also known as thermal inversions, this mode of propagation is most common to the 2-meter band. Temperature inversions are formed when there is a reversal of the atmosphere's height-to-temperature relationship, which in turn affects its refractive index. Under normal atmospheric conditions, there is a temperature decrease with ascending altitude. However, there are times when the temperature at some point stabilizes or even rises with increased height when a layer of warm air is trapped between two layers of cooler air. This warm air constitutes a thermal inversion and with it, the refractive index is increased.

Inversions can propagate VHF and UHF signals up to three times the normal range and, depending on their intensity, signals will be either weak with some flutter or rock solid with very little fading. This phenomenon is prevalent along coastal areas, especially in the spring and fall. This is the result of a greater temperature difference between land and water. Although inversions are primarily a nighttime effect, smaller inversions often occur just after dawn and after sunset, when some enhancement of the signal can usually be noticed.

Tropospheric ducting. The causes of tropospheric ducting cannot be explained easily, but most scientists and propagation experts seem to agree that they are the product of wind shears, which are high velocity winds that are blowing in opposite directions to each other. The boundary area between these winds has the ability to propagate VHF and UHF signals thousands of miles. Ducts can be very selective to various geographical areas, with other stations at points in between not being aware of its existence. In other words, if a duct were to form between New England and Texas, stations in places such as Tennessee and Kentucky, which are along the duct's path, may not necessarily be able to take part in the opening.

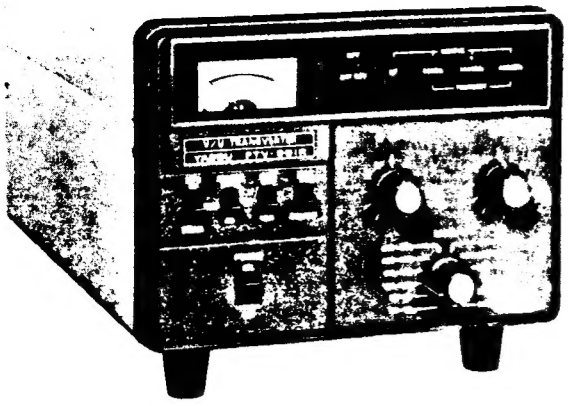


Photo B. The use of transverters such as the FTV-901R, which is compatible with the Yaesu 901 series, is a cost-effective way of getting on 2-meter SSB.

Ducting can continue anywhere from a few minutes to a few days. It is this propagation mode which has made possible QSOs between stations in Hawaii and California, which is a distance of approximately 2500 miles.

Ionospheric propagation. Sporadic E, aurora, meteor scatter, and transequatorial propagation (otherwise known as TE) are propagation modes that fall into the ionospheric or solar-related category.

Sporadic E. Sporadic E gets its name from heavily ionized clouds that form in the E-region of the ionosphere, which is about 60 miles above the earth. It is rare for these clouds to reflect 144-MHz signals, but when they do, E-skip contacts can be made up to approximately 1200 miles. The formation of these E-clouds is the result of wind shears and, to a certain extent, intense thunderstorm activity, which produces very high cloud tops.

Excellent indicators for a possible E-skip opening on 2 meters are TV channels 4, 5, 6, and especially the FM broadcast band, which ranges from 88 to 108 MHz. Also, when skip conditions become extremely short on 6 or 10 meters to within a few hundred miles, it is a good idea to begin looking on the band for something to happen.

Although E-skip can occur at any time, seasonal peaks do take place from June through August and again during December and January. Openings can last anywhere from a few minutes to a few hours, but since E-clouds are moving at a high rate of speed and their ionization density is critical for supporting 144-MHz signals, conditions change very rapidly.

Finally, double-hop E-skip is rarer still, but it has been done, with contacts made in excess of 2000 miles.

Aurora. Intense ionization of the polar regions following disturbed periods on the sun allows amateurs to reflect their signals off heavily ionized patches or auroral curtains. Curtains are formed when solar disturbances emit particles which arrive at Earth a few days after the storm is first observed. These particles then congregate at the polar regions and form what is known as an aurora.

Since the aurora is a culmination of numerous patches of intense ionization which are in constant motion, VHF and sometimes UHF signals are reflected back in different phases. This multi-path reception or phase difference causes the received SSB signal to have a whispery or sometimes garbled effect and CW signals to sound like a hiss instead of a pure note.

Auroras are common during the winter and summer equinoctial periods, with peaks generally taking place from 4:00 pm to 8:00 pm local time. For obvious reasons, the mid- and high-latitude states experience many auroral openings per year, but from time to time its effects can be felt as far south as the Gulf states. Contacts are normally on the order of 800 miles, although some of over 1200 miles have taken place.

Auroral contacts. By pointing the antenna towards the north a few days after a solar disturbance, auroral contacts are possible. Normally, CW signals are the only ones to be heard, but if the aurora is intense enough, SSB can be copied with signals sometimes well over S9.

When calling CQ on CW it is customary to send "CQ A" or "CQ AU." On sideband, the call is simply "CQ Aurora." One important thing to remember is that since SSB is received as whispers or even garbles, it is imperative that one speak slowly, using phonetics and trying to enunciate words properly. Unless conditions are near perfect, E's, T's, C's, D's, etc., sound an awful lot alike. With pure notes not being received on CW, reports are given as 59A instead of 599.

Since the aurora is in constant motion, signal strength will vary from time to time during the course of a QSO. Therefore, it is sometimes necessary to peak for maximum signal by moving the antenna a few degrees either way. At times, a movement of 10 degrees can make the difference between Q5 copy and not hearing the station at all.

Meteor scatter. As mentioned before, sporadic-E and auroral propagation are possible through the direct result of intense ionization. This holds true with meteor scatter also. Meteors which enter the Earth's atmosphere burn up, leaving trails of ionization which at times have the ability to reflect radio waves, permitting contacts in excess of 1500 miles. The length of time that an ionization trail remains intact and intense enough to support 2-meter signals is dependent upon the size of the meteor and its orientation to the amateur station. Most meteor bursts (or *pings*) last a few seconds, with a rare few exceeding 15 seconds. Thus, high-speed CW is the preferred mode although SSB is being used more and more.

Meteor-scatter DXing. With most contacts being arranged through predetermined schedules with other stations, attempting to work meteor-scatter DX requires patience and perseverance. Since working through random meteors is time consuming, almost all contacts are attempted during major meteor showers such as the Perseids in late July and early August, where the hourly rate of meteors entering the atmosphere is very high.

The operating procedures for working meteor-scatter DX are too extensive to list here. However, the basic format is for one station to transmit during the first and third quarter of each minute while the other station trans-

144.000–144.050 MHz	EME (Moonbounce) CW
144.050–144.060 MHz	Beacons
144.060–144.100 MHz	General CW and weak signals
144.100–144.200 MHz	EME (Moonbounce) and weak-signal SSB
144.200 MHz	National calling frequency
144.200–144.300 MHz	General SSB operation

Note: Upper sideband (USB) mode is used.

Table 4. 144-MHz SSB/CW band plan.

mits on the alternate 15-second periods. It may go on like this for hours until both stations acknowledge callsigns and signal reports. Most important, though, is that phrases such as "this is" and "your signal is" be eliminated, as most bursts are relatively short. As far as output power is concerned, 80 Watts is sufficient for making contacts without too much trouble. Surprisingly, many amateurs have made successful QSOs with as little as 10 Watts.

Transequatorial propagation. Transequatorial propagation (or TE) has been evident on the 6-meter band for some time, but just recently over the last decade has its presence been felt on 2 meters. TE takes place in the F2 region of the ionosphere and, as far as it is known, is accessible to stations centered at equal distances on both sides of the geomagnetic equator. For example, contacts of close to 5000 miles have been made between Europe and South Africa and between Puerto Rico and Argentina.

Season	Tropo	E-Skip
Summer	9	23
Fall	6	1
Winter	2	1
Spring	29	11

Table 3. Seasonal breakdown of observed band openings into the Fort Worth, Texas, area over a seven-year period.

Year	Tropo	E-Skip
1976	4	2
1977	10	6
1978	5	1
1979	6	6
1980	5	2
1981	8	7
1982	7	11
Total	45	35

Table 1. Annual breakdown of observed band openings into the Fort Worth, Texas, area over a seven-year period.

DX: What to Expect

As with any phenomenon, the mechanisms which facilitate VHF DX are at times unpredictable. Although there are exceptions to almost every rule of propagation, long-term statistical analysis of band openings does prove certain things.

Len Hoops KC5IJ provided me with a computerized list of band openings into the Fort Worth, Texas, area over a seven-year period from 1976 to 1982. Once I categorized these openings according to year, month, and season, it was evident that everything I had ever read concerning VHF propagation was basically true. The numbers didn't lie.

Keep in mind that some parts of the country experience more band openings, especially where tropo is concerned. As mentioned earlier, this is due to geographical location (tropo is more prevalent along coastal areas). Despite this, the numbers are still indicative of seasonal peaks.

Looking at the annual breakdown of observed band openings, it is interesting to note that the number of tropo-DX openings was about the same each year, whereas E-skip DX varied quite a bit. On the average, KC5IJ experienced 6 tropo and 5 E-skip openings per year. (See Table 1.)

Month	Tropo	E-Skip
Jan	0	1
Feb	1	0
Mar	1	0
Apr	3	0
May	5	0
Jun	21	11
Jul	0	10
Aug	7	9
Sep	2	4
Oct	3	0
Nov	0	0
Dec	3	1

Table 2. Monthly breakdown of observed band openings into the Fort Worth, Texas, area over a seven-year period.

The monthly breakdown shows that June is by far the most active month in terms of DX. This is true just about everywhere. Spring and fall show an increase in tropo DX which was noted earlier, and the summer months clearly reveal that this time of year is the best for working E-skip. (See Table 2.)

SSB/CW Band Plan

Table 4 shows the band plan for the low end of 144 MHz. For the most part, this particular plan has gained acceptance and is adhered to on a nationwide basis. As you can see, 144.200 MHz is the national calling frequency, and most of the activity is centered here.

Making Contact

On SSB it is perfectly all right to call CQ just as you would on the HF bands. As a matter of fact, this is standard operating procedure. When calling CQ, it is generally a good idea to give your callsign phonetically, your location, and in which direction you are beaming (if a directional antenna is being used). If a vertical antenna is being utilized, say so during your CQ. This will be very helpful because almost everyone is horizontally polarized and the subsequent cross-polarization loss is around 20 dB. That weak signal that one may think is DX can sometimes be a station 10 miles away on a ground plane.

Once contact is established with another station, a move up in frequency to 144.210, 144.220, 144.230, etc., is recommended. Ragchewing on or very near the calling frequency is frowned upon, so it's best to QSY once contact is made. As for CW buffs, it is OK to call CQ on CW on 144.200 MHz. But once again, it is recommended to QSY once contact is made.

Activity

When it comes to the level of activity on 2-meter SSB, it is no different than any other ham band—it has its up and down periods. Generally speaking, 90% of all activity occurs between 6:00 pm and midnight local time, and to a lesser degree from 8:00 am to 11:00 am local time. But don't be fooled! Unfortunately, many operators leave their rigs sitting on 144.200 MHz and listen to white noise when the band may be open. Whether it's three in the morning or three in the afternoon, one cannot assume that the band is dead. You have to make calls to get results.

In addition, one of the nicer things about the SSB portion of the band is that there is an even mix between rag-chewers, VHF DXers, experimenters, home-brewers, and the like. It is basically a band of moderate activity with plenty of elbow room for everyone. Splatter and QRM are almost nonexistent except for the busy periods of VHF contests, when everyone seems to come out of the woodwork. And when the band cooperates with a good E-skip or tropo opening, 2 meters sounds much like 20 meters, minus the foreign DX of course.

Referring to the seasonal breakdown, it is evident that spring is the best season for DX. Although the numbers of band openings for fall and winter are much lower, they do prove that tropo and E-skip can occur at any time. (See Table 3.)

Over this seven-year period, KC5IJ worked 32 states via E-skip and 20 states via tropo for a total of 35 different states worked. His equipment varied over the years, but generally speaking he ran about 200 Watts of power with antennas that included an F9FT yagi and a 20-element collinear array.

Normal Range

The normal range of 2-meter SSB and CW depends upon many factors such as terrain, antenna height, antenna gain, power, etc. However, most will find that their range under nor-

Antennas

Cushcraft Corporation
PO Box 4680
Manchester NH 03108

Jaybeams from:
JASCO International
PO Box 29184
Lincoln NE 68529

KLM
PO Box 816
Morgan Hill CA 95037

Austin Custom Antennas
RFD #1, Tenney Road
Sandown NH 03873

F9FT (Tonna from France) by:
N&G Distributing Corporation
7201 NW 12th St.
Miami FL 33126

Amplifiers

V-J Products, Inc.
505 E. Shaw
Pasadena TX 77506

Daiwa USA, Inc.
1908A Del Amo Blvd.
Torrance Ca 90501

Arcos (kits)
Harold Bramstedt
6104 Egg Lake Road
Hugo MN 55038

Henry Radio
2050 S. Bundy Drive
Los Angeles CA 90025

TE Systems
PO Box 25845
Los Angeles CA 90025

Communications Concepts
2648 N. Aragon Ave.
Dayton OH 45420

Mirage Communication Equipment
PO Box 1000
Morgan Hill CA 95037

Tokyo Hi-Power Labs by:
ENCOMM Inc.
2000 Avenue G, Suite 800
Plano TX 75074

Preamps

Janel Laboratories
33890 Eastgate Cir.
Corvallis OR 97333

Radiokit
PO Box 4115
Greenville NH 03048

Advanced Receiver Research
PO Box 1242
Burlington CT 06013

Hamtronics, Inc.
65 Moul Road
Hilton NY 14468

Table 6. Some of the major manufacturers of 2-meter SSB equipment. Brochures and catalogs are available upon request.

operated by Johns Hopkins University's Applied Physics Laboratory in Laurel, Maryland.

The WB2IEY beacon. Sponsored by Tom Richmond WB2IEY and the Rochester, New York, VHF Group, this beacon is also operational 24 hours a day on 144.051 MHz. Located in Naples, New York, in grid square FN 12, the beacon runs 3 Watts to a pair of Big Wheels.

The WB2RJL beacon. The WB2RJL beacon has been in operation since August, 1984. It is a 24-hour-a-day beacon on 144.055 MHz. The beacon is located in downtown Winter Park, Florida, a suburb of Orlando, in grid square EL 98, and runs 20 Watts to a pair of stacked Big Wheels. Reception reports can be sent to Chris Johnson WB2RJL.

Many thanks to 73 magazine for allowing us to reprint this super article! (And to Ron Beauchemin for getting permission.)

mal band conditions is on the order of 150 to 200 miles. DX contacts are usually referred to as those exceeding 500 miles.

Propagation Beacons

As is the case with 6 meters and 10 meters, beacons are operational to assist amateurs in determining band conditions and to aid the beacon's operators in the study of radio-wave propagation, which is dependent on listeners' reports. There are currently three operational beacons in the US, with more in the planning stages. Amateurs are encouraged to monitor the beacon frequencies from 144.050 MHz to 144.060 MHz and to submit reception reports which will in turn allow propagation phenomena to be better understood.

The W3VD beacon. The W3VD beacon is operational 24 hours a day on 144.052 MHz. The beacon, which is located between Baltimore, Maryland, and Washington, DC, in grid square FM 19, runs 25 Watts to a halo antenna at 30 feet. W3VD is

Sidewinders On Two

In 1976, the need for an organization to promote 2-meter activity on SSB and CW became evident, much like the SMIRK organization for 6 meters and 10-10 International for 10 meters. Two-meter FM repeaters were threatening to encroach upon areas that were being used by SSB operators. The frequency used back then was 145.100 MHz, and a new section above this frequency was being authorized for more repeaters. The opening of the band below 145 MHz to 144 MHz to Technician-class licensees caused the national calling frequency to be moved from 145.100 to 144.200 MHz. Prior to this, only higher-grade licensees were allowed to work in the area around 144.100 being used for DX work on SSB and CW.

The SWOT organization was formed March 28, 1976, by four Fort Worth, Texas, amateurs: K5ASZ, WB5MEV (now KB5SV), W5ARR, and W5JTA (now KC5IJ). The charter members signing at this time were given num-

bers 1 through 26, with lots cast by the organizing committee for the first four numbers. W5ARR was to be chairman, WB5MEV treasurer, K5ASZ net manager, and W5JTA secretary. W5JTA also started a newsletter called the *SWOT Bulletin*; the first issue appeared in April, 1976, and it has been published at least 10 times a year ever since.

The purpose of the club was to promote 2-meter SSB and CW with an emphasis on a study of DX propagation. DX has thus become the leading interest of the members. Nets were organized starting with the Fort Worth area managed by K5ASZ, and W5JTA (KC5IJ) extended the nets nationwide. SWOT now has nets coast to coast, some with only a few members and others with as many as 50 check-ins per meeting. (See Table 5.)

Membership in the SWOT organization is open to any 2-meter operator authorized to use the band. Those who have worked two SWOT members become full members, while others may also join and become full members upon furnishing the callsigns and SWOT numbers of two members worked. Application forms appear in each issue of the *SWOT Bulletin*, although this form is not required.

The dues are $5.00 without the *Bulletin* and $10.00 with it. Renewals are the same except that family members, where extra membership lists are not needed, will be $5.00. Applications can be sent to Howard Hallman WD5DJT, 3230 Springfield, Lancaster TX 75134. The current membership in SWOT is over 2700—with Canada, Bermuda, Europe, and all of the USA represented.

The *SWOT Bulletin*, which is now edited by Harry A. Arsenault K1PLR, 704 Curtiss Drive, Garner NC 27529, is a very informative publication that the SSB/CW enthusiast shouldn't do without. The *Bulletin* includes membership activity reports, net updates, construction articles, swap and sell items, new member listings, beacon information, upcoming contests, VHF/UHF conference information, schedule requests for meteor-scatter operators, and from time to time some very interesting propagation notes written by Emil Pocock W3EP.

A certificate for working 10 or more SWOT members is available. Fifteen more contacts gets a "Worked 25" seal and other endorsements are made in steps of 25. Some members have qualified for over 350 SWOT members worked.

Each year a contest is set up for working other SSB/CW stations, the rules of which are published ahead of time in the major ham-radio magazines. Jerome Doerrie K5IS of Booker, Texas, is the awards and contests manager.

Grid Squares

In order to stimulate activity on the VHF and UHF bands, some years back Europeans devised a *QTH Kenner System*, whereby the continent was divided up into grids which were determined by longitude and latitude. With each grid and specific geographical location within the grid having its own alphanumeric designators, the exact location of a station could be determined. In time, collecting different grid squares became a popular competition on the bands.

Unfortunately, the numbering scheme utilized in this particular system could not be adopted for worldwide use. However, the *Maidenhead Locator* system has solved this problem.

The first area defined by the Maidenhead system is the 20° × 10° *field* which is designated by two letters. This field is then broken down into 100 2° × 1° *grid squares* which measure approximately 100 × 70 miles in size and are indicated by two numbers. To indicate location more precisely, two additional letters are used to indicate the 5′ × 2.5′ *subsquare* which is roughly 4 × 3 miles in area.

For example, the full locator number for my QTH in South Philadelphia is FM 29 JW. For on-the-air exchanges, it is general practice to give only the first four characters, or in my case FM 29.

On January 1, 1983, the ARRL introduced an awards program called the VHF/UHF Century Club Award (or VUCC) which involves the Maidenhead Locator. For 2-meter operators, it is required to confirm 100 different grid squares to qualify for the award. (See Fig. 1.)

Mountaintopping

Except for contest weekends, mountaintopping hasn't really caught fire here in the United States as it has in Europe. Heading to the hills to put new grid squares on the air is commonplace amongst the VHFers abroad. It is hoped that more Americans will start heading for the hills, too.

Contests

There are four major VHF contests sponsored by the ARRL that generate heavy activity on the SSB and CW portions of 2 meters. These are the VHF Sweepstakes in January, the June VHF QSO Party, the September VHF QSO Party, and the 2-Meter Spring Sprint which was held for the first time in April of 1983. With many stations heading to hills and mountaintops for that extra edge, contests are the perfect time to go hunting for those needed states, counties, grid squares, etc. Rarely does a contest go by without some sort of opening taking place which turns the band into a frenzy that is unlike anything you've ever heard.

Suggested Reading

As noted earlier, my main intention was to inform the reader that there is activity on the SSB and CW portions of 2 meters and to introduce the Sidewinders On Two organization. It was not my plan to delve into the technical aspects of equipment, antennas, and propagation, but instead to give a very brief overview on these subjects. I hope I have succeeded. As for further reading and research, there are many excellent books on the market that the 2-meter enthusiast shouldn't do without.

A few of these are the *VHF Handbook for Radio Amateurs* by W9EGQ and W6SAI, the ARRL *Radio Amateur's Handbook*, the ARRL *Operating Manual*, and the Radio Society of Great Britain *VHF/UHF Operating Manual* by G3RPE and G6JP.

One Final Note

Two-meter SSB is regarded by some as uninteresting or even boring. True, it is not for everyone. But sooner or later the patience and perseverance of those who frequent the band pay off with tremendous band openings which make it seem all worthwhile. There is no comparing the elation of working VHF DX to DXing on the HF bands, as the propagation on HF is just too predictable.

Just ask any 2-meter SSB convert. It is much more satisfying to crack the pileup for the South Dakota station on 1000-mile E-skip than it is to work that HV on twenty. If you don't work the HV from the Vatican, he may be back again tomorrow. But if you don't work the South Dakota station on 2-meter E-skip...well, you get the picture! ■

LETTERS RECEIVED

K1BE

11/29/86

Dear Jeff:

Yours was the only readable address on the January issue of Zero Beat that I (finally!) received the other day. From the appearance of the enclosed address page, it may have gone by way of Uranus!

Would you please see that my address is changed to that appearing above? I always enjoy reading the paper. Though not many names and calls mentioned these days mean much to me, there are still some that go back a long way in my ham experience. The people who formed HCRA, and those who have kept it going so successfully since, have done an exceptional job for ham radio, over many years. I had gone to live in Connecticut by the time that the club was formed, but I attended a good many meetings and watched its progress with admiration, and some envy. When I started in ham radio the amateur radio scene in the Springfield area was like a "nation divided against itself" and a breakup seemed almost inevitable. HCRA started at just the right time, and in the right way. Some or all of the early adversaries were Silent Keys, or had moved to other areas by then, and the new group (and remnants of the old) found a formula that worked then and obviously is still working to this day -- and Springfield is the better for it!

I note that a request is made that anyone who has earlier QSTs than 1957 supply the data for the earlier years of the VHF Sweepstakes. Since I was instrumental in starting that contest, and had been doing the QST vhf column for quite a few years before the VHF SS began, I have a complete file on the contest (in QSTs that go back to 1931) and would be glad to fill in the years before 1957, if nobody else has done the job already. One thing I did not throw out when we moved to Florida was my QST file, all in bound volumes, covering some 54 years. They occupy corner book-cases in two corners of my Florida hamshack. They represent a sizable proportion of the moving costs -- but I certainly was not going to heave them out. I'd be glad to look up information of any kind in early issues, if anyone up there needs that kind of help. I have a long-term index, which is quite a help -- as I no longer can recall everything that appeared in QST, like I once could. Something about age, I guess, though I'm only 78.

Quite a few old friends from the Frozen North are in this area, beginning with the Gordons, and Tom Barrett -- who recently suffered a stroke and is still hospitalized. I believe the Gordons are up North. Eunice's mother being in a bad way, too. We miss all three at monthly luncheons of the Hernando Chapter, QCWA, of which we all are Charter Members. Was delighted to have a chat with Dick Stevens recently, he having stopped by to visit the Gordons, shortly after we arrived down here to become Florida Natives.

I work all bands from 160 to 2 meters here. I can't recall if I've worked anyone from the Springfield Area for the past two years or so, except on 50-MHz sporadic E. When that breaks out, we hear WIs FB!

When I first got on the air from this location, in October, 1983, I could work New England stations on 10 and 15 meters easily. With sunspot numbers being mostly zero's these days, propagation to WI is nil on 10, except for sporadic E, and when I hear that stuff breaking out I go to 6 immediately. Not much of it at this time of year, but I did have one great Sunday Morning session with dozens of my old WI cohorts. Unfortunately, it was the weekend before the VHF SS, which was a pretty quiet time, down here, this time around.

We sold our Connecticut home some months ago. I really hated to do that, but it was getting to be too much for me to handle. I could not afford to hire people to do the work, and though I always loved to work around the place, it was obvious, in recent years, that we'd have to let it go sometime.

I have been very fortunate to have had some great ham locations in my nearly 54 years in the game. That old Wilbraham Tower, and the group of fellows who used it in the early '30s, were instrumental in my getting hot enough about ham radio to actually get a licence and get on the air, which I did in 1933. I never thought, then, that I'd have the Tower for my own use, but I did, from 1939 to the outbreak of WW II (and the involvement of the USA in it) at the end of 1941. Then, at the end of the War came the chance to go to work for ARRL, and luck was with me again -- I was able to obtain the use of the famous Selden Hill home in West Hartford, that (because of the involvement of the late, great Ross Hull) eventually became almost hallowed ground for Amateur Radio, and especially for the vhf fraternity. My hilltop home in Canton, 1948 to 1985, gave me similar opportunities for good work -- and it was "my life" for all those years. I left it with deep regret -- but we have a nice place down here, which is much easier to take care of -- an important consideration at my age.

Propagation is excellent here, on all bands. I have a lot of fun with moderate power, and with makeshift antennas that would never have done much for me up north. The nearly 1200 miles farther south changes the world of ham radio entirely. One tends to get lazy -- or I should say more lazy, down here.

Example: On 2 meters I have a single 12-element Yagi (fibreglas boom Austin design) at only 32 feet up. I have 70 watts output on ssb, and when the tropo is right I get 9-plus-40 reports across the Gulf of Mexico, out to more than 1000 miles. 432 works equally well, probably better. At least one fellow just south of me has worked the Texas Coast with a hand-held transceiver, using its own antenna, on 432 ssb!

I've worked all over South and Central America, and about 20 states, so far, on 50 MHz, with 80 watts and a dipole you'd never believe.

My only other antenna currently is a 40-meter sloper, which I use on 80 through 10 (and also on 6 and 2, if I wish) with matching networks needed, of course, except on 40 and 15.

Well, Jeff, I didn't intend to write a book, so will stop, before I have to number the chapters! Hope to see you, and other HCRA friends, now and then. Will be back in CT this coming summer for a while but may not be on the air much, except with mobile or portable gear from time to time, as the spirit moves. May also operate K1ZFE now and then, too. Sooo -- for now, 73,

Ed Tilton, W1HDQ

PS -- If HCRA has a "historian," I have some interesting material -- if it didn't get lost in our moving down here.

FOR SALE: Kenwood TH41AT 440-450 mhz FM with extra battery, manual. $150.00 Ned NB1R 413-596-4625

FOR SALE: Icom IC-215 2 meter transceiver, 15 crystals, 30 watts, Drake TT mike, Excellent condition, Must sell, best offer. Don Shukan, WB1BZG, 413-567-1033 afternoons.

FOR SALE: Dentron Supertuner for HF, $75.00; 432 linear, 2 meter linear, both use 4CX250 tubes, both for $50.00; Hallicrafter speaker, $10.00 (small one); TNC-1 Packet radio box, set up with my FT726R, $225.00; 12 volt, 20 amp lab power supply, $90.00; Mirage B108 2 meter amplifier, with manual, $100. 10 in 80 out.; Kenwood TR8400 440-450 mhz FM synthesized transciever, $225.00; Kenwood 2 meter crystal transceiver, all local pairs, manual $100.00 Jeff K1BE 413-569-6739 evenings

In Memoriam

On January 28, 1986, in the clear, blue skies over Cape Canaveral, seven lives were lost. A team of space explorers perished in the explosion of the Space Shuttle "Challenger." A statement issued by ARRL Executive Vice President David Sumner, K1ZZ, put it this way:

> Ever since the Owen Garriott, W5LFL, Shuttle mission in 1983, hams (who have always been among the more ardent followers of the space program) had developed a special feeling for the Shuttle program...The flags in front of the ARRL Headquarters have been lowered to half-staff in tribute to the Shuttle crew.

Although no radio amateurs or ham radio experiments were aboard the "Challenger" on its final voyage, this spacecraft was special to the Amateur Radio Community. It was on "Challenger" that Tony England, WØORE, flew a scant six months earlier in July 1985 with Amateur Radio equipment aboard.

We share the grief felt by NASA, the astronaut corps, and the families and friends of the six astronauts and school teacher Christa McAuliffe, who were lost with the Shuttle "Challenger." Our hopes and dreams rose into the sky with them. They hold a special place in each of our hearts. May God rest their souls.

The American Radio Relay League

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